

Cigarette smoking among in-school adolescents in Yilo Krobo municipality in the Eastern Region of Ghana

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SUMMARY

Background: Adolescent cigarette smoking is of public health importance since many adult smokers had initiated the habit as adolescents. This study aims to determine the prevalence of cigarette smoking among in-school adolescents in Yilo Krobo Municipality, Ghana and factors associated with cigarette smoking.

Methods: A school-based cross-sectional analytic study was conducted in February 2017 in Yilo Krobo Municipality in the Eastern Region of Ghana. A stratified random sampling method was applied to select 700 students. After obtaining informed consent, structured questionnaires were administered to collect information on demographic characteristics, behaviours, family, peer and school factors. Data was entered into SPSS and analysed with level of significant as p-value of less than 0.05. Univariate, bivariate and multivariate analysis were applied to determine prevalence and risk factors of cigarette smoking.

Results: A total of 700 students participated in the study and the prevalence of cigarette smoking was 14.3% (100) and 77.5% (76) were introduced to smoking by their peers. Those who started smoking cigarette at the age of 10 years and below were 32% (32). Factors associated with cigarette smoking were being in JHS 1 (AOR:2.23, p=0.006), close friends smoking cigarette (AOR: 2.26, p=0.001), having drunk alcohol before (AOR: 6.0, p<0.001) and having ever used marijuana (AOR: 6.48, p<0.001). However, recognizing marijuana usage to be wrong was protective against cigarette smoking (AOR: 0.58, p=0.006).

Conclusion: Cigarette smoking among in-school adolescents exists in Yilo Krobo Municipality and school-based interventions such as counselling services on substance use should be implemented to address these behaviours.

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Keyword: Cigarette-smoking, Adolescents, Prevalence, Factors, Ghana

INTRODUCTION

Adolescent cigarette smoking is of public health importance since many adult smokers had initiated the habit as adolescents. Adolescents are people within the age group of 10 to 19 years and this marks the adolescence which is a developmental stage. A study conducted in USA showed a prevalence of 15.9% of cigarette smoking among 12th graders.¹ Also smoking among adolescents has short to medium term health effects in the smokers as well as peers who may be exposed to environmental smoke. Smoking in adolescents may be a marker of other harmful lifestyles such as engagement in illicit drug use, alcohol use, psychiatric illnesses and sexual intercourse.² A study conducted by the Centres for Disease Control and Prevention (CDC) in Kurdistan-Iraq reported the prevalence of tobacco use including cigarette smoking among in-school adolescents as 11.9%.

The study further found that among current smokers boys were significantly more likely than girls (21.0% versus 2.1%) to smoke cigarette.³ Another study conducted among in-school adolescents in Lithuania found the prevalence of cigarette smoking to be 35.8% and 27.1% among males and females respectively.⁴ A study conducted in Khartoum state in Nigeria showed smoking prevalence among adolescents to be 13.6% and students in public school were more likely to be smokers (10.7%) compared with those in private school (2.9%) with age of initiation being as early as 11 years old.^{5,6}

A comprehensive report of global adolescent smoking patterns³ has shown in general male predominance is high in Africa and Asia, while in the United States and parts of Europe, the gap between the sexes is limited.

The differences may have to do with cultural acceptability of female smoking.

A school-based study among selected Junior secondary schools in Ghana by Wellington et al, reported that of 1,917 respondents, 14% had ever smoked cigarette, 19% currently use a form of tobacco.⁴ Factors found to be positively associated with cigarette smoking among adolescents were exposure to tobacco advertisement, smoking in a parent, smoking in a best friend, emotional problems including depression and recent negative life events.⁷

Studies have shown that those who use alcohol, cigarette or marijuana were found to be 2-6 times as likely to have had more than one sexual partner in the last year indicating a clear association.⁸ Tobacco use among adolescents is therefore of a public health concern since it has other health related problems. Initiation of tobacco use among adolescents can result in tobacco use disorder since the adolescents' brains are still developing, nicotine has effects on the brain's reward system and brain regions involved in emotional and cognitive functions.⁹

However Tobacco control regulations 2016 (L.I 2247) and Part six of Ghana Public Health Act, 2012 (Act 851) among other provisions prohibit sale of cigarette to minors, that is people aged less than 18 years.¹⁰ Studies suggest that the nicotine-related changes to these areas of the brain during adolescence may perpetuate continued tobacco use into adulthood.

These changes also contribute to a higher rate of other substance use disorders among people who use tobacco during adolescence, sometimes referred to as a "gateway" effect.¹¹ This study aims to determine the prevalence of cigarette smoking among in-school adolescents in Yilo Krobo Municipality and factors associated with cigarette smoking. This will provide database to design interventions to address in-school adolescents cigarette smoking.

METHODS

The study was a school based cross-sectional analytic study carried out in Yilo Krobo Municipality in the Eastern Region of Ghana from 16th February to 20th March 2017. The municipality has a population of 97,466 with adolescent population of 18,519.¹²

The study adhered to the tenets of Helsinki declaration and ethical approval was granted by Ghana Health Service Ethics Review Board (GHS-ERC: 2/11/16). Adolescents aged 10 to 19 years from high schools in the Municipality took part in the study and a total sample size of 700 was used for the study. In order to ensure validity, a

stratified random sampling method was employed to select the students from the schools.

A list of all Junior high schools and senior high schools in the Municipality was obtained from Ghana Education Service. The junior high schools were separated from the senior high schools to form different strata. The junior high schools which were 54 in number were further grouped into urban schools and rural schools to form two strata and sampling frame with the listing of the schools was formed for each stratum.

Four junior high schools were randomly selected from rural stratum and three junior high schools from the urban stratum by use of balloting to obtain seven JHS. In the schools, registers containing all the names of JHS students were obtained and Stata was used to generate and randomly select 50 students from each school to make a total of 350 students.

The two Senior high schools in the municipal formed another stratum and 175 students were randomly selected from each SHS school through balloting to get a total of 350 students from the SHS. A total of 700 students were then enrolled into the study. Inclusion criteria were adolescents aged between 10-19 years schooling in Yilo Krobo Municipality, who were in JHS or SHS and in the selected study schools.

Newly designed structured questionnaire was used to collect quantitative data. Twenty paramedical staff with three supervisors were intensively trained for two days on the questionnaire administration and data entry to ensure quality in data collection process. They were then divided into teams comprising of two members to form ten teams.

To ensure validity and reliability, the questionnaire was pre-tested in selected schools in a neighbouring district with similar characteristics to the study site by the teams after which a final one-day training was conducted to correct any problems detected in its administration. Written informed consent was obtained from all participating students above 18 years.

For participants below 18 years, consent was obtained from parents/guardians through writing to explain the study and requested for their endorsement of the consent forms. This was followed by endorsement of an assent form by these under-aged participants. An informed consent or assent form was read out in the appropriate language (English) to them outlining the risks and benefits of being interviewed and giving them the opportunity to decline to be interviewed or to discontinue the interview at any time.

Thereafter, the questionnaires were administered to the students in the classroom under the supervision of their teachers and the data collectors. To ensure data quality, the data was edited and mistakes rectified on the field by trained supervisors.

Data Analysis

The data was entered using SPSS version 21 and analysed in SPSS and Stata 13MP. Each question was assigned a code for the purpose of data cleaning, entry and analysis. Completed questions were verified before entry and cleaning in the Statistical Package for Social Services (SPSS) version 24 and then exported and analysed using Stata 13MP.

The variable assessed were categorized and presented using their frequencies and percentages and then shown in tables in the results section. Concerning the analytic aspect, outcome variable was cigarette smoking and exposure variables included socio demographic characteristics, parental factors, peer factors and behavioural factors. In determining the factors associated with cigarette smoking among in-school adolescents, first the Chi-square test of independence was used.

This was used to test the associations between the independent variables such as socio- demographic, personal, peer factors, parental and adolescent risky behaviours factors and the outcome variable, that is cigarette smoking. The Chi square figures are reported with its corresponding p-value (significant at $p < 0.05$).

The logistic regression analysis was used to identify the significant factors associated with cigarette smoking controlling for other variables. The associated adjusted Odds Ratios (AOR) were reported with their 95% Confidence intervals (CI) and p-values (significant at $p < 0.05$).

RESULTS

A total of 700 students participated in the study and the age range of participants were 12 to 19 years. Participants who were 14 years and below formed 32.7% (229), those between 15 years to 17 years were 53% (371) and those who were 18 years and above were 14.3% (100).

Participants from senior high school (SHS) were 50% (350) and those from junior high school (JHS) were also 50% (350). Male respondents were 48% (336) and females were 52% (364). Majority of respondents (71.6%) have their parents married or cohabiting, 11.6% (81) were living with single parents and 12.6% (88) living with divorced parents.

Educational level of fathers were primary to JHS level 51.7% (362), SHS level 27.3% (91) and tertiary level being 7.7% (54). Those without any formal education were 5.9% (41).

Table 1 Responses on cigarette smoking

Variables	n(%)
Have you ever smoked cigarette before? (n=700)	100 (14.3)
Yes	
No	600 (85.5)
How old were you when you smoked a whole cigarette for the first time (n=100)	
I have never smoked a whole cigarette	22 (22.0)
10 years and below	32 (32.0)
11-14 years	23 (23.0)
15 years and above	23 (23.0)
Who introduced you to cigarette smoking (n=100)	
No response	2 (0.0)
A friend	76 (77.5)
A relative	5 (5.1)
Self	17 (17.4)
During the past 90 days, on how many days did you smoke cigarette (n=100)	
≤9 days	90 (90.0)
10 - 29 days	6 (6.0)
All 90 days	4 (4.0)
Do any of your close friends' smoke (n=700)	
No response	1 (0.0)
Yes	132 (18.9)
No	463 (66.2)
Don't know	104 (14.9)
Do any of your parents or relatives smoke (n=700)	
No response	5 (0.0)
Yes	113 (16.3)
No	525 (75.5)
Don't know	57 (8.2)

The study showed prevalence of smoking to be 14.3% (100) among study population and 32% (32) of those who smoked initiated smoking when they were less than 10 years. More than seventy-seven percent (76) of those who smoked were introduced to smoking by their friends and 4 % (4) smoked in all 90 days indicating addiction. Interestingly all the 4% (4) were in JHS.

The factors identified to be associated with cigarette smoking from the bivariate analysis of socio-demographic factors were being a male ($\chi^2:1.69, p=0.015$), being in the JHS ($\chi^2:1.72, p=0.013$) and having divorced parents ($\chi^2:1.81, p=0.036$).

Smoking cigarette was independently associated with having friends who smoke ($\chi^2:5.62, p < 0.001$), drinking alcohol ($\chi^2:11.21, p < 0.001$), marijuana use ($\chi^2: 15.9, p < 0.001$), friend drinking alcohol ($\chi^2:3.89, p < 0.001$), parents smoking cigarette ($\chi^2 :2.15, p=0.002$), relative use of alcohol ($\chi^2 :1.68, p=0.018$), involvement in trading activities ($\chi^2 :1.7, p=0.015$) and school absenteeism ($\chi^2: 2.24, p < 0.001$).

Table 2 Sociodemographic factors and cigarette smoking

Variable	Cigarette use		X ²	P value
	Yes N (%)	No N (%)		
Age				
14 years and below	40 (17.5)	189 (82.5)	1.45	0.095
Above 14 years	60 (12.8)	410 (87.2)		
Sex				
Male	59 (17.7)	274 (82.3)	1.69	0.015*
Female	41 (11.3)	322 (88.7)		
Place of stay				
Yilo Krobo	73 (15.0)	414 (85.0)	1.2	0.447
Outside Yilo Krobo	27 (12.8)	184 (87.2)		
Grade				
JHS	61 (17.6)	285 (82.4)	1.72	0.015*
SHS	39 (11.1)	314 (88.9)		
Father's Employment status				
Working	88 (14.4)	524 (85.6)	0.76	0.72
Not working	2 (18.2)	9 (81.8)		
Marital status				
Married	63 (12.6)	438 (87.4)	0.59	0.025*
Not married	33 (19.5)	136 (80.5)		
Divorced	19 (21.6)	69 (78.4)	1.81	0.036*
Not Divorced	77 (13.2)	505 (86.8)		
Single	14 (17.3)	67 (82.7)	1.29	0.41
Not single	82 (13.9)	507 (86.1)		

Table 3 Parental and other factors and cigarette smoking

Variable	Cigarette Use		X ²	P value
	Yes N (%)	No N (%)		
Close friends smoking status				
Close friends smoke	49 (37.1)	83 (62.9)	5.62	0.001*
Close friends do not smoke	44 (9.5)	419 (90.5)		
Parents smoking status				
Parents smoke	26 (23.0)	87 (77.0)	2.15	0.002*
Parents do not smoke	64 (12.2)	461 (87.8)		
Alcohol use				
Ever drank alcohol	84 (30.5)	191 (69.5)	11.24	0.001*
Never Use alcohol	16 (3.8)	408 (96.2)		
Parents Drinking status				
Parent drink	33 (18.3)	147 (81.7)	1	0.001*
Parents don't drink	67 (12.9)	451 (87.1)		
Friends drinking status				
Friends drink	49 (29.3)	118 (70.7)	3	0.001*
Friends do not drink	51 (9.6)	478 (90.4)		
Relative drinking status				
Relatives drink	40 (17.6)	187 (82.4)	1	0.001*
Relatives do not drink	60 (11.3)	472 (88.7)		
Neighbors drinking status				
Neighbours drink	48 (16.9)	236 (83.1)	1	0.001*
Neighbours do not drink	52 (12.5)	363 (87.5)		
Marijuana use				
Ever used marijuana	29 (65.9)	15 (34.1)	15.7	0.001*
Never used marijuana	71 (10.8)	584 (89.2)		
Involvement in trading or commercial activities				
Involved in activities	60 (17.6)	281 (82.4)	1	0.001*
Not involved in activities	40 (11.2)	318 (88.8)		
Absenteeism				
Ever absented	65 (18.9)	279 (81.1)	2.24	0.001*
Never absented	33 (9.4)	317 (90.6)		

Cigarette smoking was independently associated with students who were 14 years and below ($\chi^2: 1.9, p=0.032$), Ever had sex ($\chi^2: 3.52, p<0.001$), multiple sexual partners ($\chi^2: 2.02, p=0.019$), having been forced to have sex ($\chi^2: 2.17, p=0.005$) and bisexual orientation ($\chi^2: 2.55, p=0.014$).

Table 4 Sexual behaviours and cigarette smoking

Variable	Cigarette Use		X ²	P value
	Yes N (%)	No N (%)		
Ever had Sex				
Yes	60 (25.1)	179 (74.9)	3.52	0.001*
No	40 (8.7)	420 (91.3)		
Sex at age				
14 years and below	35 (31.5)	76 (68.5)	1.9	0.032*
Above 14 years	25 (19.5)	103 (80.5)		
Sexual partners				
Multiple partners	31 (33.3)	62 (66.7)	2.02	0.019*
No multiple partners	29 (19.9)	117 (80.1)		
Safe sex				
No condom use at last sex	39 (23.9)	124 (76.1)	0.82	0.538
Condom use at last sex	21 (27.6)	55 (72.4)		
Ever been forced to have sex				
Yes	20 (24.4)	62 (75.6)	2.17	0.005*
No	80 (13.0)	537 (87.0)		
Sexual orientation				
Both male and female	14 (42.4)	19 (57.6)	2.55	0.014*
Either male or female	46 (22.4)	159 (77.6)		

Table 5 Logistic regression analysis of factors associated with cigarette smoking

Variable	COR	AOR	95% CI	P value
Sex	1.69	0.79	0.45, 1.37	0.417
Grade	1.72	2.23	1.26, 3.39	0.006*
Find using marijuana wrong	0.5	0.58	0.39, 0.85	0.006*
Ever had sex	3.52	1.53	0.28, 8.82	0.630
Age at having sex	1.9	1.05	0.88, 1.25	0.573
Sexual partners	2.02	0.83	0.65, 1.06	0.130
Ever been force to have sex	2.17	0.86	0.37, 1.88	0.714
Sexual orientation	2.55	0.99	0.55, 1.80	0.983
Close friends smoke	5.62	2.26	1.47, 3.77	0.001*
Parents smoke	2.15	1.0	0.60, 1.70	0.996
Ever drank alcohol	11.21	6.0	3.29, 11.37	0.001*
Relative drink	1.68	0.96	0.58, 1.76	0.885
Ever used marijuana	15.9	6.48	3.09, 14.79	0.001*
Involved in trading or commercial activities	1.7	1.12	0.66, 1.90	0.688
Absenteeism	2.24	0.86	0.70, 1.05	0.141

After adjusting for other variables, significant factors associated with cigarette smoking were being in JHS 1 (AOR: 2.23, $p=0.006$), close friends smoking cigarette (AOR: 2.26, $p=0.001$), having drank alcohol before (AOR: 6.0, $p<0.001$) and having ever used marijuana (AOR: 6.48, $p<0.001$). However, recognizing marijuana usage to be wrong was protective against cigarette smoking (AOR: 0.58, $p=0.006$).

DISCUSSION

The prevalence of cigarette smoking was 14.3% out of which 32% of respondents started smoking cigarette when they were 10 years old and below. A similar study in USA and Nigeria shows prevalence of smoking cigarette to be 15.9% and 13.6% among adolescents.^{1,6} Though the USA shows a higher prevalence and a lower prevalence in Nigeria, the situation in Ghana is of great concern and needs immediate intervention. The early initiation of smoking as young as 10 years and below reported in this study is worrisome and a study conducted in Nigeria reported similar results.⁵ This behaviour may be as a result of cigarette and other tobacco products being easily accessible to adolescents through many commercial outlets.

The Tobacco Regulation in the country prohibits sale of tobacco products to adolescents, however poor monitoring by relevant agencies normally results in challenges with compliance making tobacco readily accessible to adolescents. Moreover, lack of adequate education of retailers, adolescents and their families on the provisions stated in the Tobacco Regulation can result in tobacco use among adolescents as some adults who smoke sometimes send adolescents to purchase cigarette for them, thereby exposing them to tobacco use.

Early initiation in cigarette smoking leads to future addiction to tobacco and other substances and may lead to health effects such as psychiatric illnesses, chronic bronchitis, lung cancers and coronary heart diseases as reported in other studies.^{2,9} Peers have great influence and majority (77.5%) of adolescents who smoked mentioned that they were introduced to the habit by friends. The influence of peers on adolescent cigarette smoking has been reported in several studies.^{3,12}

The bivariate analysis showed an independent association between cigarette smoking and school absenteeism which will affect the academic performance of the students. This has been confirmed in another study which indicates that youth who smoke cigarette have difficulties such as absenteeism and delinquent behaviours at school.¹⁴ Adolescents who smoke may get addicted to tobacco products which will end up in school absenteeism and poor academic performance. Another independent association found with cigarette smoking is parental divorce and this is explained by lack of parental supervision and support which leads to risky adolescents behaviours such as cigarette smoking and alcohol use.¹⁵ Parental divorce can also result in mental health issues such as depression among adolescents which can result in substance use such as smoking cigarette.

Another independent association to cigarette smoking found in this study is being a male and is in conformity with report of global adolescent smoking patterns³ that showed general male predominance in smoking cigarette being high in Africa and Asia. The differences in smoking between males and females may have to do with cultural acceptability of male smoking in relation to female smoking since some cultures find females smoking cigarette unacceptable.

After adjusting for other variables, being in JHS that is the younger age group is significantly associated with smoking cigarette and this may be due to early experimentation of smoking in younger years which may stop as they grow older. These findings are different from that of a school-based study conducted in Sudan which found higher incidence of smoking in the older aged adolescents compared to the younger ones.¹⁶ This presents an opportunity that early initiation of tobacco preventive programs targeted at the young adolescents will possibly prevent further abuse in older adolescents.

Close friends smoking cigarette is significantly associated with smoking among the respondents. This finding is consistent with various studies conducted elsewhere that identified significant association between smoking and close friend smoking cigarette.^{4,16} Peers influence is therefore great and constant exposure to friends who smoke will expedite the process of behaviour copying since adolescents have the need to be accepted by their peers. A legislative instrument aimed at regulating the activities of tobacco use in Ghana which include the ban on sale of tobacco to minors has been passed and is found in the Public Health Act.¹⁷

The use of marijuana is also significantly associated with cigarette smoking and this relationship is reported in other studies.¹⁸ Once adolescents abuse one drug, other drugs can also be abused. Furthermore, the study identified that recognizing that using marijuana is wrong, is protective against cigarette smoking which supports the identified association. Programs designed to address one type of substance use in adolescents can help in preventing the use of other substances.

Limitations of the Study

Since this study touches very sensitive and very personal issues, social desirability responding cannot be ruled out, however respondents were assured of confidentiality to assist in addressing this limitation. Also, the design of the study makes it impossible to draw inferences about the direction of relationship between the dependent and independent variables.

CONCLUSION

The study showed a high prevalence of cigarette smoking among in-school adolescents. A majority of those who smoked were introduced to the habits by peers. Associated factors include use of other substances like marijuana and alcohol.

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